POLICY BRIEF

Smarter, trusted and climate-ready livestock breeding in Europe

Executive summary

*Livestock breeding is a strategic lever for making European animal production more resilient, sustainable and competitive. The results of **GEroNIMO** and **RUMIGEN** show that EU policy should support four priorities: practical and cost-efficient breeding tools, climate adaptation through both diversity and selection, stronger pathways from research to uptake, and innovation that is governed in a way that builds public trust. Together, they support Europe's potential to maintain a strong livestock sector under environmental, economic, and societal pressure.*

Why this matters?

European livestock systems face multiple pressures: *climate change*, *environmental constraints, animal health* and *welfare* challenges, *market volatility*, and increasing societal expectations regarding sustainability and ethical production. Animal breeding and genetics are among the few long-term tools that can improve resilience and sustainability across generations. This is already visible in practice: breeding goals across Europe have expanded over time from production traits alone to include traits such as fertility, longevity, calving ease, health, and robustness, showing how breeding can respond to wider societal and sectoral needs. Its importance goes beyond technical progress supporting biodiversity, the uptake of innovation, public trust and the long-term competitiveness of European livestock production. Many EU objectives in climate adaptation, sustainability, resilience, productivity and rural viability cannot be met without effective research and innovation in animal production. Future EU research and innovation policy should therefore recognise animal breeding, genetics and related technologies as enabling areas for Europe's wider goals on sustainability, food security, climate adaptation, biodiversity and strategic autonomy.

What RUMIGEN and GEroNIMO show?

1. Livestock breeding innovation must be practical and scalable

Both projects show that breeding strategies can be strengthened through better predictive approaches and cost-efficient tools that operate in real breeding conditions: lower-cost phenotyping, improved prediction models, multi-omics integration, and data-driven methods usable across different production contexts. These outputs are at different stages of maturity, and their routine use still depends on further validation and integration into breeding programmes. Where these conditions are met, such tools can improve selection decisions in both commercial populations and smaller local populations and help breeders make better use of data in real conditions.

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Policy relevance:
EU Livestock Policies should encompass new and modern breeding tools and methods that are practical, cost-efficient, and scalable, including for smaller breeding contexts, while also enabling and strengthening innovation in mainstream commercial livestock systems, where most production and environmental impacts are concentrated.

2. Innovation in livestock breeding needs a trusted policy framework

The societal and ethical research in both projects shows that innovation in livestock breeding is not judged only on technical safety or efficiency. Public trust, responsibility, transparency, animal welfare and alignment with societal values also matter. Trust cannot be treated as a mere communication issue; it must be built through a credible policy framework.

Policy relevance:
For EU policymakers, this means creating a regulatory pathway for new breeding technologies that is both **responsible and enabling**. Public trust is more likely when there is a clear framework showing how animal welfare, safety, proportionality, transparency and accountability will be considered, while also allowing innovation to move forward where it can bring real value. In other words, regulation should help shape the conditions for trustworthy innovation from the start, giving breeders, researchers, citizens and markets greater clarity about the safety of these technologies used in livestock breeding.

3. Climate adaptation requires both diversity and selection

The projects confirm that climate resilience cannot rely on a single approach. Europe needs both the conservation and active use of adaptive genetic resources, and stronger selection strategies for resilience, heat tolerance and robustness in mainstream livestock populations. Local breeds are part of the solution, but so are modern breeding tools that help commercial populations adapt to future conditions.

Policy relevance:
The livestock policy should support a two-track strategy: protect and use local adaptive diversity, while also investing in advanced breeding for commercial systems facing increasing climate pressure.

4. Europe needs stronger pathways from research to uptake

A recurring message from both projects is that valuable livestock breeding research often remains stuck too close to proof-of-concept. If Europe wants results that can be tested, validated and deployed, animal breeding and genetics must be better connected not only to collaborative research calls, but also to funding routes that help mature innovation towards uptake.

Policy relevance:
Animal breeding and genetics should be better reflected in FP10 and the European Competitiveness

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Fund and in wider innovation instruments that help move promising results from lower to higher TRLs. This is crucial if we want research to create impact.

Main policy messages

Future EU Research and Innovation policy should support systems that are:

- ⇒ **climate-resilient**, by combining adaptive diversity with selection for resilience and robustness
- ⇒ **innovation-ready**, by investing in practical and cost-efficient breeding tools
- ⇒ **competitive**, by ensuring that livestock systems can access state-of-the-art technologies;
- ⇒ **socially legitimate**, by embedding trust, welfare, and responsible governance in innovation pathways.

Conclusion:

The combined results of GEroNIMO and RUMIGEN point in a clear direction: the future of livestock breeding in Europe should be built on practical innovation, adaptive diversity, stronger uptake pathways and trusted governance. In the next EU research and innovation framework, animal breeding and genetics should be treated as part of Europe's strategic capacity to deliver a more autonomous, resilient, sustainable and competitive livestock sector.

More:

Websites:

- GEroNIMO: https://www.geronimo-h2020.eu/
- RUMIGEN: https://rumigen.eu/

E-book of abstracts:

- GEroNIMO: https://www.geronimo-h2020.eu/book-of-abstracts
- RUMIGEN: https://rumigen.eu/rumigen-book-of-abstracts/

RUMIGEN and GEroNIMO are EU-funded projects working to improve livestock breeding by combining genetic, epigenetic, and phenotypic knowledge to support more sustainable and resilient animal production.

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